



#9.

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Koji SHIGEMATSU et al.

Application No.: 10/028,711

Filed: December 28, 2001

Docket No.: 111607

For: A PROJECTION OPTICAL SYSTEM, A PROJECTION EXPOSURE APPARATUS  
AND A PROJECTION EXPOSURE METHOD

PRELIMINARY AMENDMENT

Director of the U.S. Patent and Trademark Office  
Washington, D. C. 20231

Sir:

In Reply to the Notice of Incomplete Reply dated June 7, 2002, please amend the  
above-identified application as follows:

IN THE ABSTRACT:

Please replace the Abstract filed on May 6, 2002 with the substitute Abstract attached  
hereto.

REMARKS

The Notice of Incomplete Reply indicated that the Abstract filed May 6, 2002  
exceeded 150 words in length. The attached Abstract does not exceed 150 words in length.  
The attached Appendix includes a marked-up copy of the original Abstract showing the  
changes made thereto.

Examination in due course is earnestly solicited.

Respectfully submitted,



Mario A. Costantino

Registration No. 33,565

MAC/ccs

Attachments:

Replacement Abstract  
Appendix

Date: June 21, 2002

**OLIFF & BERRIDGE, PLC**  
**P.O. Box 19928**  
**Alexandria, Virginia 22320**  
**Telephone: (703) 836-6400**

**DEPOSIT ACCOUNT USE  
AUTHORIZATION**

Please grant any extension  
necessary for entry;  
Charge any fee due to our  
Deposit Account No. 15-0461

1003671-063403

## APPENDIX

## Changes to Abstract:

The following is a marked-up version of the amended Abstract.

ABSTRACT OF THE DISCLOSURE

A projection optical system that projects an image on a first side onto a second plane through a plurality of lenses includes the following elements in order from the first side to the second plane: a first lens group that is arranged in an optical path between the first side and the second plane and has a negative refractive power, a second lens group that is arranged in the optical path between the first lens group and the second plane and has a positive refractive power, a third lens group that is arranged in the optical path between the second lens group and the second plane and has a negative refractive power, a fourth lens group that is arranged in the optical path between the third lens group and the second plane and has an aperture stop in the optical path, and a fifth lens group that is arranged in the optical path between the fourth lens group and the second plane and has a positive refractive power. An A clear aperture of a lens surface or an outer diameter of a lens of the plurality of lenses in the projection optical system as has a relative maximum in the second lens group, a relative minimum in the third lens group, and a relative maximum in the third-fifth lens groups, and has only ~~one~~ one significant minimum between the first side and the second plane. At least one of the plurality of lenses is held such that at least one of a position and an orientation of the lens is adjustable, and a numerical aperture of the second plane of the projection optical system is equal to or more than 0.8.